Letters to the Editor

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Central cannulation in acute aortic dissection repair

To the Editor:

We read with great interest the article by Reece and coworkers[1] on central cannulation for acute aortic dissection. We have also experienced the safety and the advantages of this technique, which we have routinely applied to 37 patients.[2]

The authors limited the application of this technique to one third of their patients. However, we think it could be routinely applied for type A dissection, as far as true channel antegrade perfusion is firmly established. There seem to be three prerequisites to establish reliable true channel perfusion invariably: safe cannulation, confirmation of true channel cannulation, and confirmation of antegrade true lumen perfusion.

First, safe cannulation with the Seldinger technique requires decompression of the cannulation site in advance, which could be induced pharmacologically, by insertion of femoral inflow, or by blood drainage from right atrial cannulation. In addition, a thin-walled flexible cannula with a spindle-shaped obturator and tapered dilators is indispensable.

Second, epiaortic ultrasound imaging helps to confirm the position of the tip of the cannula within the true lumen of the proximal arch. Epiaortic ultrasound provides more detailed information on the ascending aorta and proximal arch than does transesophageal echocardiography.[3]

Third, epiaortic color Doppler imaging provides real-time direct information on dynamic flow inside the false and true channels, which is effective for the assessment of antegrade perfusion via true lumen.

We congratulate Reece and colleagues on their outstanding results.

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Reply to the Editor:

We would like to thank Drs Inoue and Ueda for their kind comments regarding our publication on central cannulation of ascending aortic dissections. Since finishing this study, we have heard from multiple sources that they have used this technique for cannulation of ascending aortic dissections. In fact, just as Drs Inoue and Ueda describe, several groups have commented that this is their preferred method of cannulation for these patients. This collective experience further supports our notion that direct cannulation of the dissected ascending aorta can be done safely and is a viable option for surgeons operating on this difficult aortic disease.

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How should I cannulate my next acute aortic dissection?

To the Editor:

We read with interest the article by Reece and associates[1] supporting the feasibility and implying the potential advantage of direct cannulation of the dissected aorta

(central cannulation) compared with peripheral cannulation (femoral or axillary) in the management of patients with acute type A aortic dissection. The authors compared retrospectively the results achieved in 24 patients cannulated via the dissected ascending aorta versus 46 cannulated via the femoral artery (n = 31) or the axillary artery (n = 15).

The authors claimed the groups to be comparable on the basis of age and preoperative comorbidities. Similarly, they reported no differences in bypass time, cross-clamp time, or hypothermic circulatory arrest time between the two groups. The peripheral group had more cardiac events (peripheral 15% vs central 0%; $P < .05$) and a higher mortality than the central group (peripheral 19.5% vs central 4.2%; $P < .05$). The authors conclude that direct cannulation of the dissected aorta is safe and, used with the appropriate indication, might optimize postoperative outcomes in this disease entity.

The complete cardiothoracic surgeon must be adaptable to change and open to new predicaments. It would help, however, if these new thoughts, which often revolutionize much of what has been previously asserted for decades, would result from impeccable studies. Indeed, great methodologic vigilance and lack of bias outline the basic difference between evidence-based medicine and anecdotal experience or simplistic observations.

Is this the case with the study by Reece and colleagues?

Overall, the study reports a *single* institutional experience collected *retrospectively* over a *1-decade* time period, all these being widely recognized methodologic limitations. In retrospective institutional studies arbitrarily limited to a given time period, data are retrieved by homologous observers from chart review rather than being recorded as they occur. Unrecognized group differences and observer bias constitute major problems.

Criteria to choose the site of cannulation are not reported in the article and are said *to vary* over time and among *different surgeons*, which implies that different patient subgroups might have undergone different approaches over time.

Most patients are said to have been cooled to a core body temperature of 18°C to allow *20 to 30* minutes of circulatory arrest time. *Antegrade perfusion* was reported to be used only *recently* and in *some* axillary cannulations, but *retrograde cerebral perfusion* was *generally* employed. *A variety* of neuroprotective pharmacologic *strategies* were reported to be used during the study period.

Indeed, it appears that many different variables might have affected neurologic outcome. Three different methods of cerebral protection were adopted (sole deep hypothermia and circulatory arrest, antegrade selective perfusion, and retrograde cerebral perfusion), together with a variety of nonspecified neuroprotective pharmacologic strategies. This, also in view of the limited patient sample size, makes interpretation of data about neurologic outcome totally unfeasible. Should any of the 30-day mortality be due to neurologic causes, it would be very hard to relate them to the cannulation site.[2]

Surgeons' preferences are said to have dictated the adjunct procedures, including coronary artery bypass grafting (CABG).

Indication for myocardial revascularization in type A aortic dissection is controversial.[3] Apart from cases with evidence of coronary dissection, for which the indication often goes without saying, it may be difficult to establish an indication for CABG. Compounding the problem is the rare availability of a coronary angiograms in this often urgent situation. The criteria adopted to perform a CABG are therefore important to know. They become crucial when the rate of postoperative myocardial infarction is outlined as presenting with a statistically significant difference between the two groups and supposed to be linked somehow to the site of cannulation.

Just as an example, since the criteria to perform a CABG have not been outlined in the article, should the presence of a history of coronary artery disease (as reported in Table 1) have been one of the criteria, it would appear that 6 of 7 (86%) patients with coronary artery disease among the central cannulation group versus 9 of 22 (41%) in the peripheral group underwent a concomitant CABG. This might have significantly contributed to the different coronary outcomes, independently from the cannulation site.

The two study groups were reported as similar with regard to the *chosen* preoperative *comorbidities*.

Many studies, including one from our own group on 311 acute type A dissections managed over a 25-year period,[4,5] stressed the importance of a few specific preoperative variables on surgical outcome. Therefore, judging risk adjustment and clinical outcomes including mortality, some variables (eg, mesenteric ischemia) definitely have more relevance than others (eg, rheumatic disease). Many of these universally recognized as valuable data were missing (date of surgery, hypertension, obesity, redo surgery, abrupt onset of pain, angina, acute myocardial infarction, renal failure, and any sign of malperfusion [pulse deficit, neurologic deficit or stroke, paraplegia, mesenteric ischemia, limb ischemia]), again making comparison between the two groups and interpretation of outcomes, particularly 30-day mortality, difficult and simplistically attributed to the cannulation site.

In the reported experience, the use of central cannulation was said to have increased at the same time with the *comfort* for valve preservation procedures. This statement implies a different distribution over time of one approach (central cannulation) with respect to the other. Also, as reported in the meeting discussion, it implies that more experienced surgeon(s) may have preferentially adopted the central cannulation approach, which adds another potentially crucial variable to the analysis of results.

Hospital mortality for the central cannulation group was as low as 4% (1/24), with a reported 30-day mortality of 0%, despite the fact that 62% of the patients were operated on on an emergency basis. These excellent results offer mortality figures far below those even recently reported worldwide for the surgical management of acute type A aortic dissection.[6] Without at all minimizing the authors' fine management, such results elicit some concern about the possible biased selection of this group.

Reece and coauthors should be congratulated for the excellent results achieved in their central cannulation group of patients. We share the conviction that when properly tailored for the patient, direct cannulation of the dissected ascending aorta by the reported technique is feasible, reproducible, and probably safe, as we also occasionally experienced in our series. We believe, however, that based on the presented data, a comparative analysis with more conventional techniques (peripheral cannulation)

might be misleading and potentially hazardous.

Therefore, although the authors stress that the presented data are not meant to advocate central cannulation approaches over peripheral cannulation techniques, their comparison of complications and disposition between the two groups might indeed lead to the misconception that the former procedure has potential advantage in terms of clinical outcome over the latter. This conclusion does not seem to be supported by sufficient evidence.

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Reply to the Editor:

We appreciate the comments of Drs Santini and Mazzucco on our study evaluating the safety of centrally cannulating ascending aortic dissections at the University of Virginia. As they point out, our study does have the limitations that are inherent to single-institution retrospective studies. We recognized this fact in designing the study; however, it was never our goal to prove that central cannulation is superior to the other techniques. We intentionally avoided making any statement or implication about the relative efficacy of this approach. The aim of the study was to show that central cannulation can be done safely in specific situations of ascending aortic dissection. As both Sanitini and Mazzucco's experience and our manuscript state, central cannulation of the dissected aorta is a technique that can be a safe option for well-selected patients. Furthermore, the response to our publication has made us aware of a broader cumulative experience with this technique. This response has been overwhelmingly positive, both with anecdotal experiences and with two separate international presentations from Germany and Japan on the technique in the past year. We would be happy to participate in a clinical trial on the optimal site of cannulation for ascending aortic dissection should one arise. Again, we appreciate the feedback from Santini and Mazzucco and hope that their input has clarified our central message that central cannulation of the ascending aortic dissection is both feasible and safe for selected patients.

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Central cannulation in acute aortic dissection repair: What else?

To the Editor:

In the article by Reece and colleagues,[1] the authors performed 24 central cannulations in acute aortic dissection repair over a series of 70 patients operated on between 1996 and 2005. The cannulation is performed over a guide wire by a Seldinger technique, after identifying the proper aortic cannulation site by transesophageal echography (TEE) and computed tomographic scan. The cannula is held firmly by hand during cooling because of the low reliability of the dissected aortic wall to hold a purse string. The results of this approach are remarkable inasmuch as none of the patients had a postoperative malperfusion. More important, the authors did not report any aortic rupture because of the direct cannulation. In light of this interesting series, one question has to be raised: why is the evidence not so obvious for everybody?

Lijoi and colleagues[2] were the first to report this technique in acute aortic dissection. Yet, they did not report whether they used a purse-string suture to attach the cannula. Furthermore, they did not take any precaution concerning the cannulation of the false lumen since they did not clamp the aorta before reaching deep hypothermia and subsequent circulatory arrest. In 2003, Minatoya and associates,[3] from the Hanover group, reported a similar technique, but with moderate hypothermic (28°C) circulatory arrest and antegrade cerebral perfusion during arch replacement. For these authors, cannulation and perfusion of the false lumen was not a serious pitfall. At the 2006 meeting of the European Association for Cardio-thoracic Surgery, Karck and associates,[4] from the same group, presented a series of 150 dissections over 5 years. Seventy percent were central cannulations, also without technique-related complications.

In our institution, we[5] started routinely performing central cannulations in February 2005 in type A aortic dissection. We systematically exclude patients with a high suspicion of aortic rupture or important aortic wall hematoma. Like our colleagues in Hanover, we usually put one polypropylene 4-0 purse string in the concavity of the aorta, at the junction between the ascending segment and the arch. The perfusion of the correct lumen is assessed by TEE and by a double arterial pressure control (right radial and left femoral). A malperfusion of the true lumen is accompanied by a dramatic drop of the right radial pressure at crossclamping. In this particular case, we perform a surgical fenestration of the intimal wall at the level of the arch, during a brief circulatory arrest and after releasing the aortic clamp. Over a 2-year period, we have operated on 20 type A aortic dissections using central cannulations in 75%. All the treated patients had a reimplantation valve-sparing technique (David) and, in 80% of the cases, an arch replacement under mild (30°C) hypothermia and antegrade cerebral perfusion. None of the patients had aortic rupture dur-